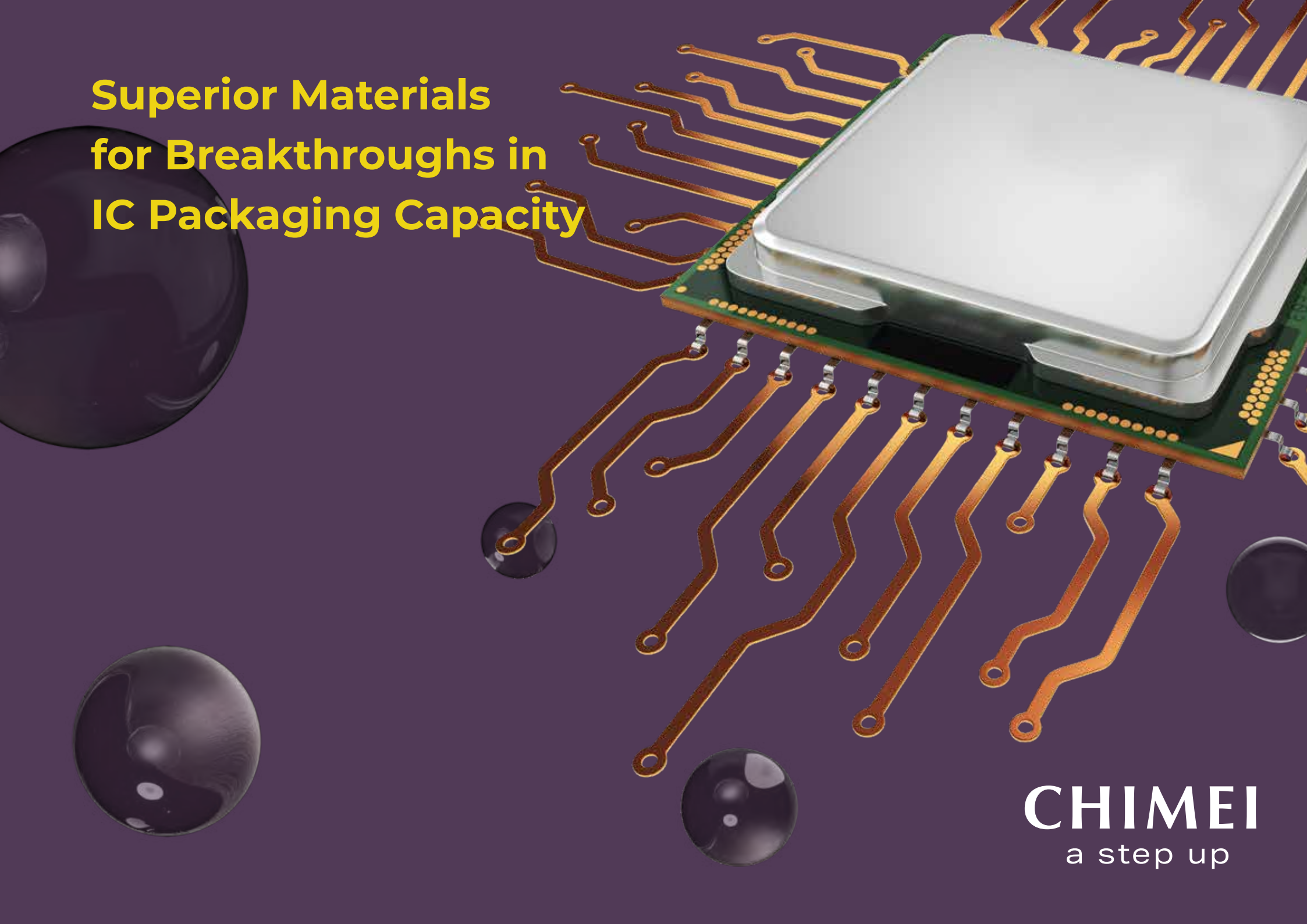
Superior Materials for Breakthroughs in IC Packaging Capacity



CHIMEI
a step up

KEY CLIENT / INDUSTRY / APPLICATION INFO

World's leading semiconductor assembly and test company

OPPORTUNITY

Provide the semiconductor industry with high-performing material solutions and prompt services

CHALLENGES

- Demand for semiconductors surging far beyond capacity for supply
- Increased operational risk and uncertainty in global supply chains posed by climate change

SOLUTION

- Developed a photoresist with high resolution and sensitivity
- Production of positive thick-film photoresists is prioritized

RESULTS

- CHIMEI's material effectively improved our client's production capacity and efficiency
- Client able to meet the sharp increase in orders
- Local supply chains established for more convenient and reliable production and R&D support

CHIMEI offers a photoresist material that helped our client boost their production capacity to meet large semiconductor assembly orders

The COVID-19 pandemic has brought about lifestyle changes such as working from home and remote learning, which accelerated digitalization and fueled the end-user demand for consumer electronics, thereby generating a continuous flow of business opportunities. At the same time, the rapid development of applications in 5G, IoT, AI, electric vehicles, and AR/VR has also driven up the demand for semiconductors, resulting in a shortage of computer chips that overloaded the production capacity of semiconductor assembly and test service providers. Thus, a global leading semiconductor assembly and test company came to CHIMEI at the end of 2020 with a difficult challenge—to come up with a new material solution that can help the company overcome its limit in production capacity.

Transforming our advantage in photoresist materials for display panels into the key to success for semiconductor assembly

CHIMEI has accumulated over 20 years of experience in the area of specialty chemicals for the display panel industry and has long focused on the development of photoresist materials and the optimization of manufacturing processes. For our first foray into semiconductor assembly, we were bound by a tight schedule and needed to achieve better performance than the current source without changing the client's original manufacturing process parameters.

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Our first measure was to widen the process window as much as possible and raise the products' tolerance limit so that the products match the client's manufacturing equipment and parameters, so as to ensure that the material provided by CHIMEI can meet the client's various test criteria.

Naturally, our goal went beyond meeting the criteria for the existing products but to also achieve the client's target of improved production capacity. This is where our expertise and experience in photoresist products for display panels become the key to success. Higher photosensitivity in photoresists can help overcome the bottleneck of the photolithography process in costly steppers, thus improving production speed. The higher the photosensitivity, the shorter the required exposure time is, which means a larger production capacity. As sensitivity is the most demanding factor in the performance of photoresist materials used for the production of display panels, CHIMEI has mastered the knowledge and skills in making adjustments to photoresist formulas for improved sensitivity. An analysis of the development history of thin-film photoresists showed that the thick-film photoresists used in semiconductor assembly have similar formulas and structures, allowing us to implement optimization by making changes to the materials used and how they are assessed. Owing to our core competency in photoresist production acquired over the years, we successfully developed a photoresist material for semiconductor assembly that achieved better performance in both sensitivity and resolution, thus helping the client boost their production capacity.

Achieving sustainability and development together with a local supply chain

CHIMEI successfully developed and began manufacturing a material that meet the client's needs in a short time, while also passing various certification tests and inspections to become their new supplier. Not only did we help the client improve their production capacity, the high resolution of our products further allows our client to stay ahead of competitions as they face the growing trend of shrinking chip size and gate width.

This success is a testament to the advantage held by local supply chains. We provide the client with customized products and localized services, and work with them to quickly develop the corresponding solutions. This also allows for flexible adjustment of production capacity, lowers costs and time spent on development and communication, and reduces the carbon emissions generated by the supply chain. By working with our client to achieve a win-win situation, we shall meet the new demands for semiconductor-related materials, overcome the challenges they present, and move toward the sustainable development of the industry.

“It’s through the constant endeavors and improvements we made over the past decade for us to able to seize this opportunity to enter the semiconductor industry and provide our client with a high-performing material of exceptional quality.”

Chun-an, Shih
Deputy Director, R&D Division I,
Specialty Chemicals Business Unit, CHIMEI

Positive thick-film photoresists

High sensitivity, high resolution, and wide process window

What is the process window?

The process window is a set of allowed ranges for manufacturing process parameters that can achieve the required specifications in the final results even when different parameters are used during the manufacturing process. The manufacturing procedures of the semiconductor industry are usually extremely complicated and involving a large number of parameters that require minor adjustments. CHIMEI therefore offers a photoresist material with a wide process window that can help the client maintain product quality and production stability, and even reduces the time spent on adjusting manufacturing process parameters, thereby improving production capacity and efficiency.

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